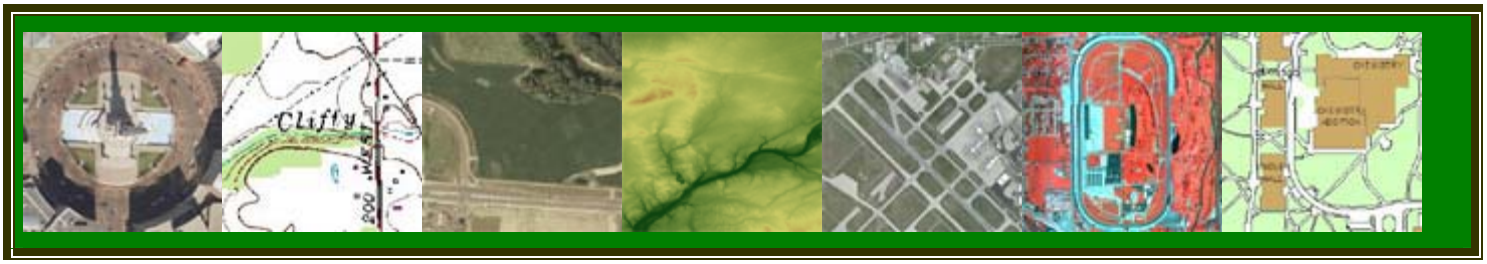


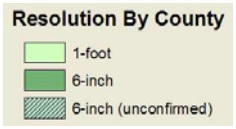
Fact Sheet #3 Indiana Statewide 2005 Color Orthophotography Project Product Specification and Deliverables

The 2005 Statewide Color Orthophotography Project develops seamless, accurate statewide aerial photography and elevation data for use in geographic information systems (GIS). All data are very high resolution and accuracy – meeting the needs of the most demanding users, like local government. This Fact Sheet describes the product specifications and deliverables.

Product Summary

Several public domain products are part of the deliverable to the State and counties. The project completion date is March 2006. Details for each product set follow this section. They include:

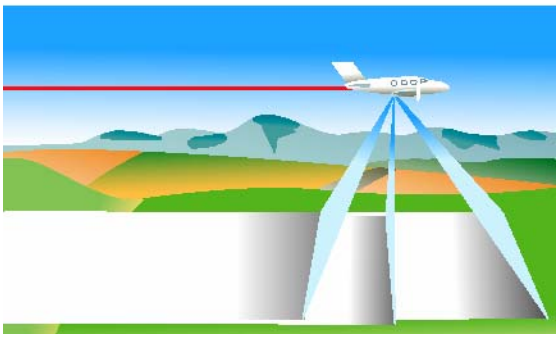
- Color Orthophotography (3 versions)
- Color-Infrared Orthophotography
- Digital Surface Model (DSM)
- Digital Elevation Model (DEM)



The statewide base product is 1-foot resolution imagery (5' or better accuracy). Thirteen Indiana counties have exercised their buy-up option to 6-inch resolution imagery (2.5' or better accuracy).

(Map last updated 2/15/05)

Data Acquisition Details



Acquisition is scheduled February through May 2005 by the EarthData team. Data processing and incremental delivery is scheduled between May and December 2005. Imagery delivery is completed by the end of 2005, and all products are delivered by March 2006 – one of the fastest delivery cycles in the industry.

The high performance Leica ADS40 Airborne Digital Sensor is used for 100% of the data acquisition. The ADS40 delivers all digital data while achieving high accuracy in large-scale mapping applications. The sensor's innovative construction allows for the simultaneous acquisition of seven bands of information. The ADS40 is a "push broom" style line-scanner that captures pictures along a scan line looking forwards, downwards and backwards from the aircraft.

Leica ADS40 Sensor

The ADS40 simultaneously captures black and white, natural color, and color-Infrared data — avoiding the need to make a difficult choice between film types. The ADS40 produces high quality digital surface models with reduced ground control requirements. And because the ADS40 receives information from exactly the same portion of the earth's surface, there is perfect co-registration of all the data sets. With the ADS40, the EarthData team has an all digital workflow from flight planning through image acquisition. They return from the flight mission with digital data ready to enter the ground processing and archiving stages. For more information see www.earthdata.com and http://gis.leica-geosystems.com/products/documents/ADS40_brochure.pdf.

Coverage includes the entire state of Indiana (36,602 square miles, more or less) with a 1,000-foot buffer outside the state boundary. Along rivers separating the Illinois and Kentucky borders, the buffer is 1,000 feet or to the opposite bank, whichever distance is greater. Data are acquired during leaf-off conditions, snow-free, and less than 5% cloud cover. Adjacent flight lines overlap by a minimum of 30 percent. EarthData acquires imagery with 60 to 80% side-lap over downtown areas in Indianapolis and Fort Wayne in order to produce "true" orthoimagery in which building lean has been eliminated.

During the project period (March 2005 to March 2006), a public "Project Tracking" web portal is available to allow stakeholders to view the status of data acquisition, processing and deliverables. (posted at www.in.gov/ingisi/ortho/).

Orthophotography Products

Product Set #1: Quarter-Quad Color Orthophotography (1-meter re-sampled)

Description: statewide coverage of natural color orthophotography re-sampled from 1-foot and 6-inch imagery
Resolution: 1-meter pixel resolution
Projection: UTM coordinates, Zone 16, NAD83/1988 adjustment
Data Format: compressed MrSID generation III file format (.sid), with world files, and uncompressed TIFF file formats (.tif) delivered in USGS quarter quadrangle (3.75 minutes) tiles
Delivery Method: one set on external hard drive and one set on DVD delivered to State

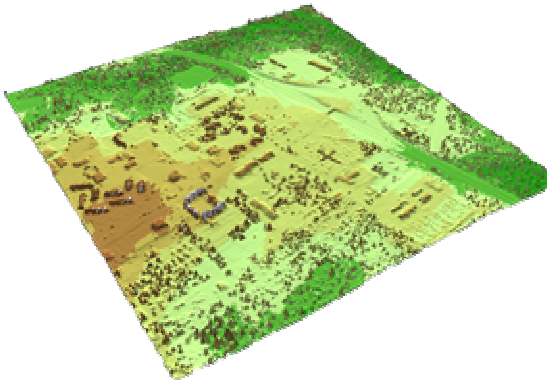
Product Set #2: County Mosaics Color Orthophotography (1-meter re-sampled)
Description: statewide coverage of orthophotography re-sampled from 1-foot and 6-inch imagery, delivered in county mosaics that produce a set of tiled images for Indiana; each county mosaic overlaps its surrounding counties, but there are no overlapping "no-data" areas (it may be necessary to split some counties into multiple files)
Resolution: 1-meter pixel resolution
Projection: Indiana State Plane (appropriate zone, east/west), NAD83/1988 adjustment
Data Format: compressed MrSID generation III file format (.sid) delivered as county mosaic file
Delivery Method: statewide coverage (92+ county mosaics) delivered as a single product set; one set per county delivered on DVD; unless otherwise arranged, delivered to the point of contact as identified by the county Emergency Management Director in their 2004 homeland security grant application (county is responsible for data distribution within their jurisdiction); one complete set delivered to State

Product Set #3: High-Resolution Natural Color Orthophotography
Description: statewide coverage of natural color orthophotography at 1-foot and 6-inch pixel resolution
Resolution: 79 counties delivered at 1-foot resolution (5' or better accuracy); 13 counties delivered at 6-inch resolution (2.5' or better accuracy) *see map on page 1*
Projection: Indiana State Plane (appropriate zone, east/west), NAD83/1988 adjustment
Data Format: uncompressed TIFF format (.tif) tiles
Delivery Method: delivered as 92 individual county coverages with a minimum of one full tile overlap with surrounding counties; single individual county coverages delivered on DVD to each respective county; unless otherwise arranged, delivered to the point of contact as identified by the county Emergency Management Director in their 2004 homeland security grant application (county is responsible for data distribution within their jurisdiction); one complete set delivered to state on external hard-drive

Product Set #4: Color-Infrared Orthophotography (1-meter re-sampled)

Description: statewide coverage of color infrared (CIR) orthophotography re-sampled from natively collected 1-foot and 6-inch CIR imagery
Resolution: 1-meter pixel resolution
Projection: UTM coordinates, Zone 16, NAD83/1988 adjustment
Data Format: compressed MrSID generation III files (.sid), with world files, and uncompressed TIFF file formats (.tif) delivered in USGS quarter quadrangle (3.75 minutes) tiles
Delivery Method: one set on external hard drive and one set on DVD delivered to State; one set on DVD delivered to each county

Elevation Products



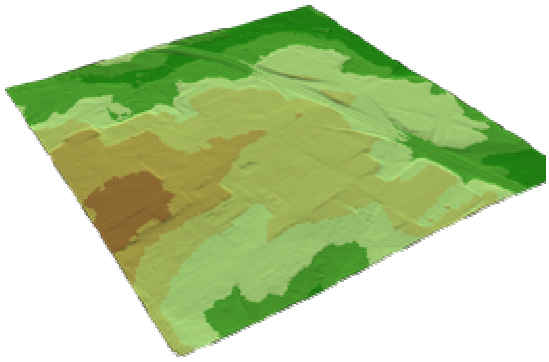
Digital Surface Model (DSM)

One of the unique features of EarthData's exclusive ISTAR processing system is its ability to generate an accurate, high-resolution digital surface model by auto-correlation of the abundant stereoscopic imagery collected by the ADS40. Using the acquired ADS40 digital imagery and EarthData's ISTAR work flow, an automated digital surface model (DSM) is generated. This process provides the following advantages:

- Known accuracy
- Cost effective
- Consistent, seamless and current

Each pixel location is measured multiple times resulting in a much higher level of horizontal and vertical accuracy when compared to the traditional film/scanning approach. The ISTAR processing system computes the X,Y,Z value for each DSM post utilizing every stereo angle collected from the ADS40 data. The final DSM generated with the ISTAR process is a "reflective-surface DEM", providing elevation data on above-ground features including buildings, trees and vegetation. This DSM is used to orthorectify the raw ADS40 imagery.

Resolution: 1- and 2-meter post spacing (variable based on terrain)
Projection: UTM coordinates, Zone 16, NAD83/1988 adjustment
Data Format: Imagine .IMG Format
Delivery Method: one set on external hard drive and one set on DVD delivered to State; one individual county set on DVD delivered to each county



Digital Elevation Model (DEM)

The Digital Surface Model (DSM) is processed to a "near bare-ground" DEM, using tools that are also used for LIDAR reflective-surface DEM editing. The DEM is perfectly co-registered with the orthophotography products. This product is suitable for a variety of applications, including:

- orthorectification of subsequent aerial imagery done by any jurisdiction (i.e., future orthophotography and GIS projects will "fit" together)
- automatic extraction of 5-foot contours
- statewide 6-inch and 1-foot resolution orthophotography will support accurate two-foot contours with further processing (not a delivery of the 2005 Orthophotography Project)

All DSM and DEM products share a common control network. Known accuracy allows for enhancements. With further processing, break lines can be compiled from stereo pairs to supplement mass points (not a delivery of the 2005 Orthophotography Project).

Resolution: 1 and 2 meter post spacing (variable based on terrain)
Projection: UTM coordinates, Zone 16, NAD83/1988 adjustment
Data Format: Imagine .IMG Format
Delivery Method: one set on external hard drive and one set on DVD delivered to State; one individual county set on DVD delivered to each county

Control

The EarthData team uses a combination of targeted and photo-identifiable ground control and airborne GPS (AGPS) controlled imagery. Up to 500 control targets are used to support the aerial photography mission. All ground control are tied to the Indiana High Accuracy Reference Network (HARN – http://bridge.ecn.purdue.edu/~oisga/in_harn.html) and are established by surveyors licensed in the State of Indiana.

Project survey crews also survey 50-quality assurance/quality control (QA/QC) checkpoints dispersed throughout the state. EarthData uses these points for QA/QC of the aerial triangulation and orthorectification. These station locations are provided to the team's photogrammetry members who locate them from the photography and compare them with the GPS derived locations. Project survey crews also survey an additional 100 photo-identifiable quality assurance/quality control (QA/QC) blind check points dispersed throughout the state that are provided to the State for external QA/QC. All control data and information are provided as part of the final deliverable products.

Metadata

EarthData delivers Federal Geographic Data Committee (FGDC) standard metadata for each orthophotography project, including a separate metadata file for each individual county coverage. The current FGDC specification used by EarthData is Content Standard for Digital Geospatial Metadata Version 2 (FGDC-STD-001-1998).

The Indiana Statewide 2005 Color Orthophotography Project is sponsored by the Indiana Counter-Terrorism and Security Council in partnership with the Indiana Criminal Justice Institute, State Emergency Management Agency, Indiana Department of Environmental Management, Indiana Department of Natural Resources, U.S. Geological Survey, IMAGIS, and the Indiana Geographic Information Council, Inc. For more information, see www.in.gov/ingisi/ortho/.